LISTING OF CLAIMS:

Claim 1 (previously presented) A two-dimensional radiation image detector characterized in that the top surface of a scintillator sheet which generates fluorescence upon incidence of a radiation has grooves cut at predetermined spacings in a horizontal and a vertical direction to a depth at least one half the thickness of the scintillator sheet, with optical fiber bundles being placed in the vertical grooves and a fluorescence reflector buried in the horizontal grooves, that optical fiber bundles are arranged on either the top or the bottom surface of the scintillator sheet or on both surfaces in a transverse direction normal to the optical fiber bundles within the vertical grooves to make a group of detection pixels that are separated by the horizontal and vertical grooves, and that the fluorescence generated by stimulation with the radiation launched into the detection pixels is detected by the optical fiber bundles placed within the vertical grooves in the scintillator sheet and the optical fiber bundles arranged on either the top or the bottom surface of the scintillator sheet or on both surfaces, thereby producing a two-dimensional radiation image,

wherein the scintillator contains a neutron converter selected from the group consisting of ^{6}Li, ^{10}B, Gd, and blends thereof, and the reflector contains a material containing an element that has an atomic number of 40 or more is used to isolate radiation between detection pixels.

Claim 2 (previously presented) A two-dimensional radiation image detector characterized in that the top surface of a scintillator sheet which generates fluorescence upon incidence of a radiation has grooves cut at predetermined spacings in a horizontal and a vertical direction to a

depth at least one half the thickness of the scintillator sheet, with optical fiber bundles being placed in the vertical grooves and a fluorescence reflector buried in the horizontal grooves, that optical fiber bundles are arranged on the bottom surface of the scintillator sheet in a transverse direction normal to the optical fiber bundles within the vertical grooves and radiation detecting mediums that generate fluorescence by stimulation with a radiation are arranged on the top surface, thereby making detection pixels that are separated by the horizontal and vertical grooves, and that the fluorescence generated by stimulation with the radiation launched into the detection pixels and the fluorescence generated from the radiation detecting mediums are detected by the optical fiber bundles placed within the vertical grooves in the scintillator sheet and the optical fiber bundles arranged on the bottom surface of the scintillator sheet, thereby producing a two-dimensional radiation image,

wherein the scintillator contains a neutron converter selected from the group consisting of ^{6}Li, ^{10}B, Gd, and blends thereof, and the reflector contains a material containing an element that has an atomic number of 40 or more is used to isolate radiation between detection pixels.

Claim 3-4 (cancelled)

Claim 5 (previously presented) The two-dimensional radiation image detector according to claim 2, wherein the top and bottom surfaces of the scintillator sheet are alternately provided with grooves that are cut at predetermined spacings in a horizontal and a vertical direction to a depth at least one half the thickness of the respective sheets, and a fluorescence reflector is buried in the grooves to make a group of detection pixels that are separated by the horizontal and vertical grooves and which are capable of producing a two-dimensional radiation image.

Claims 6-20 (cancelled)

Claim 21 (New) The two-dimensional radiation image detector in accordance with claim 1 which uses a scintillator, a liquid scintillator, or a phosphor as a detection medium and which determines the incident position of a radiation or neutron by detecting the fluorescence from the detection medium with a grid pattern of crossed optical fiber bundles in a horizontal and a vertical direction, characterized in that a photodetector and a peak height discriminator detect photons on the fluorescence from both the horizontal and vertical optical fiber bundles and construct the two-dimensional image, wherein a retriggerable pulse signal generator receives a timing pulse signal output from the peak height discriminator and generates pulse signals having a time duration determined on the basis of the Poisson distribution in correspondence with the fluorescence life of the scintillator, liquid scintillator, or phosphor medium to acquire the two-dimensional radiation image.

Claim 22 (New) The two-dimensional radiation image detector in accordance with claim 2 which uses a scintillator, a liquid scintillator, or a phosphor as a detection medium and which determines the incident position of a radiation or neutron by detecting the fluorescence from the detection medium with a grid pattern of crossed optical fiber bundles in a horizontal and a vertical direction, characterized in that a photodetector and a peak height discriminator detect photons on the fluorescence from both the horizontal and vertical optical fiber bundles and construct the two-dimensional image, wherein a retriggerable pulse signal generator receives a timing pulse signal output from the peak height discriminator and generates pulse signals having a time duration determined on the basis of the Poisson distribution in correspondence with the

fluorescence life of the scintillator, liquid scintillator, or phosphor medium to acquire the two-dimensional radiation image.